



Daily News Journal



CGEP Celebrates 20th Anniversary! 1983-2003

CGEP Proud of Success; Thanks Faculty, Students, and Staff for their Support

In a proud statement issued from their State-wide Director, Glenda R. Scales, the Commonwealth Graduate Engineering Program announced that 2003 is the 20th Anniversary of the founding of their organization. The Program was started back in 1983, the same year that the world was slowly shrinking as the population grew to an estimated 4.72 billion.

Christmas shopping proved to be unique this year as mothers spent their time waiting in line to buy chubby-cheeked dolls. Yes, folks, it was 1983 when the Cabbage Patch Doll was all the rage.

What Else Happened in 1983?

There were some very notable birthdays this year. The Metropolitan Opera in New York celebrated its 100th birthday with a day-long concert. And the Brooklyn Bridge celebrated its 100th birthday, described by *Harper's Weekly* as "our most durable monument."

Other "Firsts" this year included an American woman as the first to ride in the Space Shuttle, "Challenger." Sally Ride, a 32-year old physicist, was part of a five member crew on the six-day mission.

Yes, when you think about it, things have changed a lot in 20 years. But, after all this time, there are some things which have remained the same.

One good thing is that CGEP is still around and thriving after 20 years of hard work and lots of dedication by everyone involved . . . and most importantly, caring about our customers (students) who helped us reach this milestone.



The First CGEP Directors

George Mason University
John Wenzelberger
(retired from GMU; deceased)

Old Dominion University
William McMahon
(Associate Vice President for Academic Affairs at ODU)

University of Virginia
George L. Cahen, Jr.
(Associate Vice President for Engineering Outreach at UVA)

Virginia Commonwealth University
Thomas Haas
(Professor of Chemical Engineering at VCU)

Virginia Tech
Benjamin S. Blanchard
(Professor of Engineering-Emeritus, Virginia Tech)

Sports and Entertainment

Professional sports, as usual, kept us entertained in 1983. The NBA Championship was won by the Philadelphia 76ers who defeated the Lakers 115-108. The Washington Redskins beat the Miami Dolphins 27-21 at the Super Bowl, and the Stanley Cup title went to the Islanders for the 4th time, 4 games to 2 over the Oilers. American doctors tried to ban boxing, after a study in the *AMA Journal* found the sport to cause brain damage.



At the movies, *Terms of Endearment* won best picture. Shirley MacLain won best actress for *Terms of Endearment*, and Robert Duvall won best actor for his role in *Tender Mercies*. *Return of the Jedi* broke the box office record for opening weekend with totals of \$6,219,629. *Ghandi*, with Ben Kingsley, was also quite popular.

The Present CGEP Directors

George Mason University
Stephen G. Nash

Old Dominion University
Berndt Bohm

University of Virginia
James F. Groves

Virginia Commonwealth University
L. Thomas Overby

Virginia Tech
Glenda R. Scales

A HISTORICAL PERSPECTIVE OF CGEP

By Benjamin S. Blanchard

The Beginning

In the 1982 timeframe, Governor Charles Robb appointed a special commission to investigate whether graduate engineering could be provided in the Richmond area by the existing big universities in the State. The study resulted in a recommendation that University of Virginia and Virginia Tech would provide graduate engineering programs in the Richmond area, specifically at Virginia Commonwealth University. This, then, led to SCHEV (State Council of Higher Ed.- Michael Mullen, Associate Director of SCHEV) being assigned to take the lead and to establish such a capability. The Department of Information Technology (DIT) was charged to establish the necessary network, working both with the PBS and the telephone company.



Microwave Links

In 1983, there were two microwave links established. One would go from the Public Broadcasting TV Station in Charlottesville to WCVE in Richmond, and UVA would televise courses from the Grounds to Richmond. The second link would evolve from Blacksburg, to WBRA in Roanoke, and on to WCVE in Richmond, and Virginia Tech would televise courses from Blacksburg. The courses would be transmitted one-way video via the microwave link, and a comparable two-way audio net would be established by the telephone company. DIT would work with the PBS TV stations and with the telephone company, and VCU was held with the responsibility of providing the appropriate classrooms (which turned out to be two classrooms in the basement of Cabell Library).

Thus, in the fall of 1983, we started televising courses to Richmond (VT being on the Quarter System at the time). In preparing for this activity, there were a number of meetings at

SCHEV, with DIT, UVA, and VT involved. Further, we started visiting companies around the Richmond area - Reynolds, VDOT, Philip Morris, Allied, Alcoa, GE, Virginia Power, and so on.

In 1984, this capability was expanded with an additional microwave link from WCVE to the PBS in Northern Virginia (Falls Church) and to WHRO in Norfolk. In addition to the microwave link was, of course, the two-way audio link. Thus, the CGEP now included participation by UVA, VT, VCU, ODU, GMU, SCHEV, and DIT. Similar meetings were held in Norfolk at ODU and in Fairfax at GMU. GMU was to have some "oversight" over our Northern Virginia Graduate Center (Telestar, Falls Church); however, this turned out to be more of a parallel and semi-cooperative venture. The site in the Tidewater area turned out to be the ODU Graduate Center in Hampton (McGruder Blvd.). ODU and GMU were, along with VCU, charged to provide classrooms and the local marketing activities. In other words, Tom/George and yours truly met with the University representative in each area and did a lot of visiting (marketing).

The microwave link (with supporting audio) was used on a continuing basis through 1985, 1986, and to some extent in 1987. We had a lead representative at each of the Universities from a "programmatic" standpoint--Tom Hutchinson initially and then George Cahen at UVA shortly after we were underway, and yours truly at VT. Mickey Hendricks and later John Payne from UVA, and Stan Huffman from VT addressed the "technology" issues and worked closely with DIT. Then there were assigned teaching assistants at the receiving sites to distribute/collect homework, make sure that the classrooms and TVs were operative, etc. From an operational point, each of the participating Universities was given a budget, recommended by SCHEV and designated exclusively for this program, as well as for DIT. We (the Directors) met quarterly, with SCHEV and DIT participating. We initiated weekly teleconferences (with Tom Haas taking the lead since he represented the first of the participating receiving Universities), and we were charged with producing an

annual report to be submitted to SCHEV for approval. We initiated several "marketing" trips, each year, and to each of the three sites (visiting industries and anyone who would listen).

Satellite Transmission and New Sites

In 1987, we started planning for the transition from the microwave link to the satellite link (Galaxy 2), and in 1988 we commenced with the televising of classes from Charlottesville and Blacksburg (VT shifted to the Semester System in Fall 1988) via satellite. DIT was charged with negotiating the contract(s) with the Satellite company. We started out with about 9 different locations and experienced up to 20 different locations before we switched from "C-band" (which almost anyone with a backyard dish could see) to "Ku-band" which, of course, was more restrictive. When televising on "C-band," we had students outside of Virginia (to include Minnesota, Iowa, Pennsylvania, Maryland, Tennessee, and Texas).

We continued to expand with TV receiving sites in Roanoke (Roanoke Graduate Center), Lynchburg, South Boston (Halifax County Continuing Education Center), Mary Washington College in Fredericksburg, Shenandoah University in Winchester, NASA-Langley (as well as the Hampton site), Virginia Beach, Southwest Virginia (Abingdon), and (of course) GMU, ODU, VCU, NSWC-Dahlgren, Northern Virginia Graduate Center, as well as receiving sites in industries--IBM-Manassas, Reynolds, Allied, Virginia Power, General Electric, 3M, Exxon, Howmet. Basically, the satellite TV continued through the 1996 timeframe, and then we evolved from satellite transmission to the Virginia Network (VTEL, etc.).

Start up Challenges

We enjoyed some interesting experiences in the beginning. During the first year or so when a student first registered for a VT course in Richmond (for example), the student paid the VT tuition but had to make the check out to VCU. The same was true for UVA and was different in each of the three metropolitan areas. This, of course, com-

pletely messed up the campus/grounds registration system, although the appropriate funds were later transferred back to the institution offering the course. We tried to initiate a single common application/registration form across the state, but this didn't fly, particularly as VT had quite a few "other" students off campus who registered for courses through the Northern Virginia Grad. Center, or Seaboard Bldg. in Richmond, or the Virginia Beach Center, and so on. There were many other instances of "excitement" throughout, and particularly during the first five years of the program. Nevertheless, the program has been and continues to be a success.

My Thoughts on the Importance of this Program

1. Having five large universities cooperating jointly in the offering of a wide variety of graduate programs, through distance education means, for a twenty-year period is quite unique. While this may not be so unique with today's experiences throughout the USA, it certainly wasn't a common occurrence back in the early 1980s. Further, these Universities have agreed that up to 50% of the course work on a given plan of study can be taken from the outside (i.e., the other schools, given that the student is expecting to earn the degree from one of the institutions).

2. The institutions involved were among the earliest schools in the USA to become involved in the extension of graduate programs to remote locations. We have had a lot of experience with the "technology" and the delivery of courses through "electro-writer" (going back to the mid 1970s), then microwave, then satellite TV, then VTEL, then Internet, and various combinations thereof! I would like to believe that we (Virginia) have been a leader in the field. Of course, I neglected to mention the many courses taught off-campus/off-grounds by faculty who had to travel via Piedmont (in the old days), charter, automobile, to get to wherever, teach, and return home, 15+ times per semester.

Ben Blanchard would welcome comments – bsblanch@vt.edu

IMPORTANT EVENTS OF 1983

- **Australia won America's Cup ending a 132-year U.S. reign**
- **A Chorus Line held record performances in Broadway**
- **CGEP started its first year as a new distance-learning program**

An Unsolicited Testimonial

Dear Dr. Groves.

I would like to congratulate you and your team for the enormous effort that all of you have put in the Commonwealth Graduate Engineering Program at the University of Virginia. I just graduated this December (2002) with a M.E. Degree in Systems Engineering and a certificate in Manufacturing Systems.

I spent a wonderful time with UVA, and the help and professionalism of Rita F. Kostoff was priceless during this period. Also, the professors are really enthusiastic, and dedicated, especially Dr. Larry Richards, and Dr. Thomas E. Hutchinson, and Dr. Pradip N. Sheth from University of Virginia, and Dr. Mazen Arafeh from Virginia Tech.

I am really pleased with the program, and the only suggestion that I have is to open more courses per Degree Program, and of course promote much more the distance learning program. I am sure that a lot of people want to be in the program.

Thanks so very much.

Claribel Wendling

(Claribel attended classes at VCU. Prior to her last semester, she relocated to Arizona. She was allowed to finish her courses by video streaming.)

YOU CAN'T HAVE TOO MUCH EDUCATION



Or so says John H. Jones, who completed his M.E. degree in Systems Engineering from UVA this Spring. John also has a B.S. in Mechanical Engineering from Va. Tech, an M.E. in Mechanical from UVA, a PhD in Mechanical from UVA, and a Masters of Engineering Administration from Va. Tech

John's latest degree, as well as the Masters of Engineering Administration from Tech, was earned through CGEP while he remained in his position as Senior Advisory Engineer at Framatome ANP in Lynchburg, Virginia, where he has worked for 30 years. The Center for Advanced Engineering, directed by Jack Gwinn, served as John's host facility during his CGEP studies.

Additionally, John shared this graduation day with his son, Matthew, who received his B.S. in Systems Engineering from UVA. Matthew will continue his studies at UVA, planning to obtain an M.S. in Systems next year, having already been accepted into the accelerated BS/MS program.

Remember the old "Virginia is for Lovers" slogan? Well, the first CGEP brochure stated "Virginia Loves Engineers."

CGEP originally stood for "Cooperative Graduate Engineering Program." The name was changed in the early 1990's to avoid confusion with the university/industry "coop" programs. However, "Cooperative" has always been a major objective for the CGEP universities.

A CGEP VIEWPOINT

By George L. Cahen, Jr.

What have we learned?

The good:

Like all things in human endeavor, if you look close enough you can find things that work and things that need working on. In the case of CGEP, there were many positives, but a few that are truly worth mentioning follow. First and foremost, UVa, VT, GMU, ODU and VCU can work together and can accomplish wonderful things when they do so! In the beginning, there were program administrators that truly enjoyed working together...yes enjoyed it. Tom Haas (VCU), Ben Blanchard (VT), George Umberger (GMU), and Bill Mc Mahon (ODU) were among my closest colleagues and became dear friends in the process of getting this program established. And there were the many technicians and support personnel that kept this great outreach education program running and we all got along and learned to depend on each other even though we were often considered to be working for competing institutions.

Good teachers are good teachers are good teachers! The technology that our respective faculty had to learn and use in teaching these televised graduate courses did NOT diminish the teaching ability of our good teachers. In fact, there were many faculty members who took advantage of the ability to use taped media and computer technology to create an even more interesting and effective presentation. I found that many of our professors went out of their way to produce lectures that took advantage of the televised classroom capabilities. This benefited not only the students in the off-campus classrooms, but was also an added improvement to our on-grounds classes. At our institution, UVa, the ability to use these technologies is now just readily becoming available in our normal classrooms and

lecture halls...CGEP was almost twenty years ahead of the norm in this regard.

When the program started, there were many things to worry about--both academic and technical. Perhaps the biggest concern to me was whether or not we were going to recruit students that could successfully complete our televised graduate courses...much less complete an entire program and graduate with a degree from our school. It did not take long to realize that this was not going to be a concern. There were not only excellent off-grounds students in our classes, but often our best performing students were off-grounds. These students often added to the educational experience by bringing fresh and different views to the class discussions. Additionally, and to my great pleasure, these off-grounds students stuck with the program and completed their master degrees with a few even continuing as permanent on-grounds students in our PhD programs. Since the participating universities share their televised courses, these televised classes had a different population of learners from the more traditional on-campus only graduate courses. Often, this produced a better and more competitive environment as well as a more populated graduate course.

The not so good:

Since the creation of this program was to serve the educational needs of working engineers as expressed by their employers, perhaps I underestimated the difficulty in getting these companies to become a part of our CGEP program. I thought that it would be easy to get them to take an ownership position in the process of educating their engineering employees. Add to this the fact that I watched some companies which did become involved quickly remove themselves as soon as there was a down turn in the economy. This still does not make much sense to me, especially when you consider the relatively small expense it took to be a part of this program. My good buddy, Ben Blanchard (VT), used to always tell me that for every 1000 people who say they want something, 10 might be willing to actually pay for it and perhaps one will hang in there with you through tough

times. I still think that there is a lot that can be accomplished through direct involvement of corporate sites as receive locations for our courses, and perhaps sometime in the near future will be the correct time for this to happen.

Another disappointment was our inability to identify topics for the timely presentation of non-credit seminars and short courses to our industrial clients. After all, we have this wonderful delivery system in place; wouldn't it be nice to utilize it in this manner to generate additional income? This income could support the costs of the CGEP program as a whole and could support those academic and research programs that would produce and deliver these "hot topic" programs. Although several were tried and high hopes were abounding, little financial success was derived. It was difficult to get topic suggestions from our industrial partners. At the time, I thought that the problem was the fact that many companies participating in our program were going through the "lean and mean" years and it was difficult for them to adequately advise us much less provide the time to their work force to attend these classes. My view now is that we never fully engaged these companies to the point where they thought of the CGEP as their program...CGEP was still the universities' program! I still believe that more thought and effort needs to go into effective partnering with the participating companies and they need to take more of an ownership position if the program is to benefit from more of a give-and-take between industry and university.

"We need to guard against viewing this activity as a mature entity that just needs monitoring."

--George Cahen

In some cases (no names mentioned here) departments did not see the benefit of participating in this program. I will never understand this, since outreach is a part of all our universities' mission, not to mention that the departments receive financial benefit by participation in the CGEP.

Rather than take advantage of the opportunities presented by participating in a program like this, they would struggle to just meet their obligation and not view a faculty member's work to prepare and deliver a televised course as anything special. This recognition was necessary since these courses require extra preparation and by virtue of the larger than normal enrollments, require additional work because of increased student/faculty consultation and travel. More work with no special recognition for the faculty is not the way to win favor with the faculty. Yes there are benefits for those who fully commit to this kind of outreach program. Some of the corporate students identified expertise at a university, and this led to research and consulting activities for our faculty. Often, faculty identified off-grounds students that continued on with them by coming on-grounds to further their education. Corporate students provided discussion topics that led to improved faculty presentation materials; and by using our modern technology broadcast classrooms, many faculty got a head start on presentation materials that are used today in their on-grounds only classes that are now given in our renovated and media equipped classrooms. Today as always, this looks like a win-win opportunity for faculty/departments and students.

I would like to end by saying that I still see the opportunities as great today as when this program began 20 years ago for both the universities and the off-campus students and corporations. We need to guard against viewing this activity as a mature entity that just needs monitoring. We need to continuously push for new and increased involvement by our corporate clients. We also need to be careful in how we judge the cost efficiency of a program like this...since it is difficult to know what to compare it to and perhaps more importantly, it is difficult to actually know what it will grow to become.

*George L. Cahen, Jr.
Past Director, CGEP
UVA Engineering*

In Memoriam

Frank Butler

Founder and first director of Center for Advanced Engineering in Lynchburg; died in June 1993, after having retired in 1992.

Pat Haswell

Former site administrator at VCU under Tom Haas; passed away April 26, 1999.

Stan Huffman

Director of Technology Division of Virginia Tech during start-up of CGEP; passed away in 1992.

Ralph Lewis

Director of Continuing Education & CGEP Director at Shenandoah University; lost his battle with cancer on August 29, 2000.

John Wenzelberger

Former CGEP Director at GMU; died of a heart attack in July of 1999, after having retired in June.

ALUMNI NEWS



Dr. Armand J.

Beaudoin entered the Commonwealth Graduate Engineering Program in 1983 while an employee of the

Reynolds Metals Company in Richmond, VA. In 1986, he became one of CGEP's first graduates, earning a masters degree from UVA's Materials Science Department. Following his UVA degree, Armand continued to work at Reynolds for several years before taking a leave of absence to study at Cornell University where he earned his Ph.D. in Mechanical Engineering in 1993.

Upon degree completion, Dr. Beaudoin returned to Reynolds and worked for the company until 1997 when he caught the academic bug and accepted a position as an Associate Professor at the University of Illinois at Urbana-Champaign. Since 1997, Dr.

Beaudoin has been working to apply the power of parallel computing to manufacturing problems. His work has generated a number of successes, impacting aluminum autobody sheet production and selection of alloys for aircraft structural components.

Robert Mayfield graduated from Old Dominion University with a Master's

Degree in Engineering Management. As a student in Lynchburg, he was the first distance-learning student in the Engineering Management program to earn his degree with the thesis option. After working for a few years as a mechanical engineer, Robert found that he was commonly being placed in situations where technical skills could only partially solve clients' problems. The human factors involved required a holistic approach to deal with engineering, business culture, management decisions, and personality traits.



"Originally, I was concerned about the quality of education that could be obtained from a distance learning program; however, it turned out that the opportunities for classroom participation and access to professors was equal or greater to anything that I had encountered as an undergraduate student at Ohio State. Through the ODU program, I discovered how to understand engineering from a business perspective. This allowed me to make significant contributions to my employer, and consequently enhance my career development. The study of Engineering Management made the transition from engineer to manager much easier. I can more readily recognize subtleties in business opportunities and personal relationships, and as a result have found greater satisfaction in my work. Old Dominion University has consistently been ranked as one of the top Engineering Management programs in the country, and I would strongly encourage every engineer to consider enhancing his or her technical skills through its Engineering Management Program."

ALUMNI NEWS CONTINUED...

In 1982, **Kenton Meland** became the first student in Tidewater to earn a M.S.



through Virginia Tech's off-campus program (CGEP). He later pursued additional graduate studies from UVA, completing his M.E. in Mechanical, Aerospace, and Nuclear Engineering through CGEP in 1993.

Mr. Meland has a long career at Northrup Grumman Newport News Shipbuilding where he is presently Manager of Aircraft Carrier Program Support. As such, he is responsible for engineering, subcontracting, workload and roll planning, and financial analysis.

Mr. Meland continues to support his alma maters. He has assisted Ben Blanchard (VT) by giving lectures to his Systems Engineering graduate students; he has organized three undergraduate scholarship programs; has served on several advisory boards; and is presently serving on the Board of Directors of UVA's Virginia Engineering Foundation.

About his experiences with CGEP Mr. Meland says, "I found the professors to be very professional and willing to work non-standard hours to accommodate their students. They were extremely well organized, and they handled the additional challenge of needing a 'television presence' well. The professors were genuinely interested in feedback from the students as representatives of industry.

"When I started my first masters in 1985, I had to travel to either Richmond or Norfolk for courses, and the selection was very limited. When I was in my second program, the courses were available locally, and there was a much greater selection.

"There were numerous benefits in pursuing graduate coursework while working since I could continue my career without interruption. Additionally,

my company has a generous tuition reimbursement program making the degree programs very affordable."

Van Hanson is Engineering Program Manager at Mikom in Forest, Virginia.



He received an MSEE from Virginia Tech in 1997 through CGEP, attending classes at the Center for Advanced Engineering in Lynchburg, Virginia. Here's what he has to say about the program:

"As an engineer living in a city without a technical university, access to graduate-level instruction via satellite was invaluable for the advancement of my education. I had access to a good variety of classes, gained knowledge that had direct application to my work, and was able to earn an MSEE from one of the top-ranked engineering universities.

"My experience with the engineering program was so positive that when Virginia Tech offered their AACSB accredited program via satellite I re-enrolled in the graduate school and earned my MBA. This, too, has helped me become more effective in my work as I move more towards engineering management. These distance learning programs have been invaluable in the advancement of my career."

Susan Donahue



"I was investigating master's programs in 1996, trying to find a program where I could develop my interest in quality studies, when I discovered CGEP. Everyone with whom I spoke, whether it was at VCU, my first point of contact, or at the participating universities, was very informative and supportive. I hadn't considered engineering studies as a way to gain the knowledge I wanted; as it turned out,

studying systems engineering was one of the best choices I've made. CGEP was a perfect fit for me; I could attend a prestigious program at a prestigious university without disruption in my business and personal life. CGEP caters to the non-traditional student, which meant that I wasn't the only mid-life student attending classes, nor the only student with a full-time job. I believe that having a mix of the traditional and non-traditional students in class provided an enriched experience for everyone. I treasure the friendships I made during my studies, and am appreciative of the excellent education I received.

"I enjoyed my CGEP experience so much that I decided to apply for Ph.D. studies in my program, Systems and Information Engineering. I've enjoyed those studies as well. I've been able to develop my research and academic skills further, and have had the opportunity to exercise the skills learned during my years in teaching and industry. My studies and my skill set compliment each other very well. I'd like to remain in the educational sector after completing my degree. I've been a free-lance technical writer, editor, and consultant for almost a decade. That position has given me the ability to set my schedule to accommodate my studies and the means by which to fund the studies. I recognize I've been blessed with such a position. I also believe that "giving back" is the best way to acknowledge a blessing. I would appreciate the chance to pass my knowledge, skills, and abilities on to others in a university setting."

Susan Donahue is serving as a student representative on the CGEP Advisory Board.

We would like to hear from other CGEP Alumni. We may use your story in future marketing efforts. Send comments and updates to: jgroves@virginia.edu or cgepvt@vt.edu

Some Personal Reminiscing about the CGEP TV Program

Pradip N. Sheth
University of Virginia

I have taught in the CGEP TV program since 1987, offering a variety of courses in design, dynamics, and manufacturing. Hundreds of Master's degree graduates from the Mechanical and Aerospace Engineering program are now in a variety of leadership positions in industry in the Commonwealth of Virginia and across the country. I have personally enjoyed interacting with the more "mature" student population in the TV classrooms and I continue to believe that having these students in my class along with the "on grounds" students is beneficial all around because of the varying perspectives offered by both groups. I have many fond recollections of my experiences, some of them are:



♦ Some of the students have become presidents of small manufacturing companies. **Mark Layton**, who started taking my courses in northern Virginia came to UVA full time to work with me on his Master's M.S. Thesis and later became President of Virginia Metal Industries in Orange, Virginia. **Chuck Warren**, who took my courses from the Lynchburg site and completed his Master's project under my guidance, went on to become President of a manufacturing company in Lynchburg.

♦ Another of my students, **Kenton Meland**, took his courses at PGEC and wrote his Master's project under my guidance. Kenton has held a number of management positions at Newport News Shipbuilding where he continues to excel; he is also an active supporter of UVA's Engineering School through his work with Virginia Engineering Foundation.

♦ Another student, **Bob Humphries**, took his courses at the northern Virginia site. A veteran of the Navy and a Civil Engineering graduate of MIT, Bob wanted to switch to a manufacturing career. Through his Naval Reserve duties, Bob used to spend some weekends at a Navy facility in Norfolk, where he

decided to do his Master's thesis on a scheduling problem for aircraft maintenance. Bob's thesis was an excellent piece of work, which landed him a manufacturing position with Ford Motor Company in Dearborn, and the Humphries family has moved on to the Midwest. Bob had the habit of viewing tapes of my lectures on a TV in their bedroom. Bob's wife **Denise** is from Lynchburg and often times on their way to Lynchburg from northern Virginia, they would stop at my house for coffee. Denise told me that besides Bob, the most pervasive presence in their bedroom was I through the TV, and since during the Master's program their first child was born, they first thought of naming their child after me. Thankfully they did not follow up on that one!

♦ The interactive TV format, in which a student asking the question at a remote site is seen and heard live at all sites, has brought interesting possibilities. About four years ago, one of the students in Bristol needed to do baby sitting while taking my 6:30 PM class, so he used to bring his 4-year-old to the site there. At the beginning of the class at 6:30, the 4-year-old would come on the line and be seen and heard by all proclaiming, "Hello Teacher!!" That would then officially begin my lecture.

Dr. Sheth has been a valuable supporter of CGEP, having taught 16 times on TV, as well as serving as instructor of record for many independent study and special topics courses.

CGEP from an Instructor's Viewpoint

Robert J. Ribando
University of Virginia



I've never been good at ad-libbing in front of an audience, so when I faced my first CGEP class in 1984, it was certainly with much trepidation.

We were using microwave transmission then so we knew exactly where our signal was going (Richmond, Lynchburg and Northern Virginia). However, we had been warned that Governor Robb or our University President might just drop

by one of those receive sites to see us in "action." Well, the televised course format didn't allow a lot of that. Until the recent switch to videoconferencing, which does allow both two-way audio and video, we never saw our off-grounds students. (Nevertheless we did get to know many of them through in-class discussions, phone calls, visits and the work they submitted.) So for 75 minutes twice a week the camera was trained on either you (wearing a blue shirt and innocuous necktie so as not to create Moirè patterns on the screen) or your hand (writing as big as you could with a blue marker on a blue tablet). Recall that Dan Rather and Tom Brokaw, with whom our broadcasts compete (well, at least they were on the air at the same time as my class), are seen on the air themselves maybe only 50 minutes total a week!

As a result, the advice given to all instructors was to prepare, prepare and then prepare some more! And that's what most of us did. Because we started and ended exactly at the scheduled time, had less idle chit-chat and often prepared and distributed at least a skeleton set of notes in advance, we found that we were covering much more material in a TV course than what we would in a normal on-grounds course. Some published sources report that televised courses cover about 40% more material than their on-campus counterparts. You were usually reminded of this difference again the next year when you were teaching that same course in a local classroom with chalk and found yourself on the last day of the semester with three more weeks worth of notes!

The "excessive exposure" problem was exacerbated when we switched from microwave to C-band satellite a few years into the program. Now anyone in North America having a satellite dish could watch us! I remember my brother up in Pennsylvania telling me that he had told his own class that his younger brother was teaching live on television. The next day a student handed him a videotape he had recorded and said, "I think this is your brother!" Fortunately, back then it was mostly people who lived on farms who had satellite dishes, and I assume farmers have more exciting things to do than

watch some “college boy” write partial differential equations on a TV screen.

By the second time I taught on TV (1987), the studio provided a computer hooked directly into the broadcast system so that in effect the students’ TV monitors became computer monitors. Things were pretty primitive at the time: the resolution was only 320x200 pixels, and the monitors we had in faculty offices at the time displayed just three shades of green. So each afternoon before my evening TV class, I would have to carry a diskette over to the studio in Thornton Hall to see what my demonstration would look like in one of the two available color palettes – either cyan, magenta and white or red, green and yellow. But I did manage to create a little demonstration, most of them course-related, for each of my 28 class sessions that semester and they did serve one intended purpose - which was to get that blasted TV camera off my face for a few minutes! Actually, that first computer was so slow that sometimes I would start the demonstration, discuss the theory while the computer was crunching away, and later come back to the computer to see the results. The personal computers we have now are some 100,000 times faster than those we used in 1987, so now unfortunately my demonstrations run instantly for all practical purposes, and the camera is back on me way too soon!

More importantly, because of that early experience on TV I did realize the value of having a computer with projection capability available in any classroom. There are just so many engineering principles that one can illustrate with a good computer-based demonstration – sometimes even better than with a real physical demonstration because “virtual” fluids are not hazardous, no measuring instruments affect the flow, you can’t burn yourself, etc. As a result, in 1987 I began lobbying and fundraising to establish a room in the Mechanical building with a computer and projection capability. It was a long and drawn out process, but we finished our first multi-media classroom finally in 1991 – right in the middle of the last statewide budget crisis. Then-UVA CGEP director George Cahen, his future son-in-law, and I painted it because we charge much less than real painters; and

then because the money appropriated for a computer was suddenly frozen, I wound up “stealing” one.

We have made much progress since then. Now in 2003 the Mechanical Engineering Building hosts a “Technology Classroom Cluster” totally supported by the University central administration. We have three large classrooms with projection capability for the instructor, three studio classrooms having a computer for each student or team of students and a state-of-the-art videoconference room. The rooms are used more heavily than in the past and for many functions that are completely unrelated to engineering - thus giving valuable exposure to the School. My primitive computer demonstrations evolved into a book and CD-ROM that was published in 2002 by McGraw-Hill (*Heat Transfer Tools*, See <http://www.people.virginia.edu/~rjr/modules> for details) and is way ahead of anything else like it on the market.

Is teaching on TV tough for the instructor? You’d better believe it is! Adults with professional experience (in some cases more than you) and who are paying real tuition money can be difficult customers. With full-time jobs, a working spouse, two kids, a house to maintain and job-related travel, they are certainly demanding of themselves. They don’t mind pointing out that many of the assumptions we academics make in order to formulate and solve problems are completely bogus in the real world. And worse yet, they’ll even ask questions that you can’t answer - live on prime time TV!

Bob Ribando has taught seven times through the CGEP program and served as UVA CGEP Director for two years.

CGEP Reflections: The Changing Environment for Distance Learning

Larry G. Richards
University of Virginia

In 1985, Miles Townsend (then Chair of Mechanical & Aerospace) recruited me into the Mechanical Engi-

neering Department at the University of Virginia. My mission was to establish a graduate certificate program in Manufacturing. The Master’s Program in Manufacturing Systems Engineering was approved in the spring of 1986, and the first classes were offered that fall. I



first taught *Computer Aided Engineering and Design* solely to on-grounds students at the University of Virginia. Shortly after the end of that first offering, John Thacker suggested that the Manufacturing courses were perfect for CGEP; they would clearly appeal to engineers working in industry and provide a way for practicing professionals to keep up with the rapid developments in computing applications.

In the fall of 1987, I found myself in front of the camera for the first time. As we polled the sites to assess our enrollment, the responses were overwhelming; 95 students at 17 sites had signed up for *Computer Aided Engineering and Design*. A lot of things went wrong that first year, but the students were generally appreciative, and forgiving. The main difficulty was getting everyone access to software. 3D CAD was relatively new in 1987; most industries had not yet made the transition to solids modeling. At UVA, we were using a true 3D modeling system (Medusa) running on a dedicated Prime Computer. I had to call upon friends at several companies, at Prime Computer sites in Richmond, northern Virginia and Tidewater, and even a high school to get all my students access to Medusa. That first class was the most difficult, both because of the limits of technology, and my own unfamiliarity with the medium.

By the second offering of MAE 665, personal computers were becoming common. Over the years, we tried several CAD packages: CADKey, SilverScreen, SDRC Ideas, ProEngineer, and now SolidWorks. In all cases, we allowed students to learn any software their companies used, but we had to provide a backup for those students with no access to CAD. Until 1999, software access remained a major headache. Now I have two 3D CAD programs on

the laptop I carry home every night, and any student can buy an industry grade CAD program for less than \$200.

I traveled a lot that first semester. I tried to visit each of the academic receiving sites--Richmond, Lynchburg, northern Virginia, and Peninsula Graduate Center. Whenever I traveled to another site, I had to pre-record my class. Then I got to watch myself with a group of my students. It was often amusing, and sometimes embarrassing. Seeing yourself as others see you can be an enlightening experience. I recommend it to all teachers. That first semester, I also arranged to meet with groups of students on weekends to give tutorials on the CAD software. My graduate assistant and I essentially gave a series of short courses at sites around the state.

Paperwork was a major problem in the early years. Everything had to be mailed out two weeks in advance, and it often took a week or more for completed assignments to reach me. For someone who changes the content of a class two minutes before starting it, this environment was a challenge. Class notes, assignments, homework, tests were all major headaches, and a painful part of the distance learning experience for students and teachers.

After five iterations on CGEP and as many 'regular' classes, *Computer Aided Engineering and Design* was a mature course, and I was comfortable with teaching on television. During this time, the distance-learning environment was completely transformed by the progress in computing and communications. All students have access to the Internet. I can now make all assignments by e-mail, each class has a web page with all the class notes, office hours are conducted on-line, and homework is turned in electronically. Both computers and airtime were once expensive and limited. Now both are readily available and inexpensive.

My next challenge was teaching *Creativity and New Product Development* in the distance-learning mode. I have done so twice. In this class, student teams develop ideas for new products, prototype them, conduct patent searches, create their business plans, and produce a final report and presentation.

The class is highly interactive. The students must talk to each other. I had to learn to give my students the same freedom they would have in an on-campus version of this class. Virtual teams work very well if the professor doesn't get in the way. In the most recent version of this course, all scheduled class sessions were interactive. When I felt it necessary to give a lecture, it was available as streaming video on the Internet, and the Powerpoint version was on the class web site. Students could view the lecture whenever it was convenient for them.

Two revealing experiences:

One benefit of taped classes is that students who miss a class can still view it! This is helpful when students have job demands or assignments that can prevent attending class. One of my students was called to active duty in the Navy during the first Gulf War. So I sent her a box of the videotapes from my class, the necessary software, and all the assignments. I expected that she would complete the course from her base in San Diego during the regular semester. But I didn't hear from her for quite a while. Then one day over a year later, I received all her completed assignments and a note. She had been deployed to sea, and had been unable to communicate with me from her ship. But she had access to a VCR and a computer. So she watched the tapes and did the assignments on-board ship, and was only able to send them to me when she returned to her homeport. In the note, she said that a group of about six of her shipmates watched all the tapes with her. Apparently, things were so boring at sea that I was the most entertaining diversion available.

When I teach on TV, I try to watch my tapes on a regular basis--both to see how the class looks to the students and also to update my notes to reflect what actually happened in the classroom. Questions and comments from the students often lead a class in interesting directions. With videotapes, I can follow such paths, and reflect on their impact and significance. However, one year the tapes were never available when I wanted them. One of the on-grounds students checked them out every week. When I asked, I learned

that a group of foreign students met each week to review my classes and discuss the material. They could stop the tape at any time and talk among themselves until they were sure they all understood what I was saying. Eventually, even some native English speakers joined this group. The tapes provided self-paced instruction, and the students had created a learning community. Distance learning can help provide the ideal learning environment, even for on-campus students.

Larry Richards is serving as a faculty representative on the CGEP Advisory Board. He has taught six times on TV and written papers and articles on TV teaching.

The TV Model of Delivering Statistical Education

Dr. James M. Davenport
Virginia Commonwealth University



Dr. Davenport has taught STAT 541, "Statistics for Engineers and Scientists," on TV for CGEP every Fall since 1988

(with the exception of Fall of 1991.) Not only has he taught each Fall to a "live" class, but he has also allowed students to take his class as an independent study during other semesters and summers. His Statistics class can be used as an elective for many degree programs, and, in fact, is a requirement for some.

Dr. Davenport wrote a paper on his experiences with TV teaching, entitled "The TV Model of Delivering Statistical Education." Following are excerpts from that paper:

My personal experience with televised instruction began as a student in 1967 at SMU. Two of four courses I took my first semester in graduate school were televised courses sent to several remote industrial sites via a closed circuit, microwave system. I have been teaching applied statistics for engineers and scientists as part of the Commonwealth Graduate Engineering

Program every fall since 1988 (with the exception of 1991).

The program began rather modestly with UVA and Va. Tech broadcasting live classes via the Virginia Public television stations' microwave network to a receive site at VCU in the fall of 1983. The first year of the program was considered a success, and it was expanded in 1984 by extending the "hosting" to GMU and ODU. The delivery method was changed to use of satellites in 1986. The program became instantly available to many more remote sites all over the state and nation. In the late 90's the system was again changed to a broadband computer network that allowed for two-way video as well as two-way audio.

As my Statistics course is currently constituted, it is a mixture of local undergraduate engineering students enrolled in VCU's School of Engineering and of students off campus who are enrolled in CGEP. I get different feedback from these two distinct groups of students. For the local students who take this course, this is usually their first encounter with a "distance/TV" course. They tend to be intimidated by the TV studio/classroom and are reluctant to engage actively in the classroom question/discussion periods. The off-campus students tend to like this format very much. Most of the students are "working students" and do not have the luxury of being in a class at every class meeting. Job demands are always calling them to some crisis or another, and after all, their jobs generally do come first. They really like the versatility that is offered by the video taped lectures and/or the video streaming of the lectures. Likewise, all class materials are on-line and are available 24/7; the students can do the work whenever it fits into their schedules. On some occasions, I do have to make adjustments in assignment deadlines to accommodate these students, but over the past 14 years, it has not been much of a problem. These students tend to want to complete the course in as timely a fashion as possible.

In setting up this model for delivering instruction, we learned early on to get it on tape. Regardless of what happens in the nether world of computer

networks, you keep the cameras rolling and get the lecture on tape. We are now creating Real Media files real time, and hence, they are available the same evening, whether or not the signal was broadcast. This is another example of technology working well. All of the students appreciate this!

Computer and software resources that are needed to prepare and manage materials pose no problems now, but from 1988 to about 1995, it was a big problem. In 1988 we were using Word Perfect 4.2 which had no Greek letter characters nor any mathematical symbols in 30 or 36 point fonts. All of those special characters had to be written by hand. This was a time consuming pain. Fortunately, modern software and applications are now more than adequate to do the job.

I have found that it takes two to three times as much time to prepare for this type of teaching as opposed to a "regular class." All of this tends to make me super prepared and super organized for the class. Another pressure that contributes to this is the knowledge that you are "on camera" and it is being videotaped. There is no such thing as a "blown lecture" – an Oh-well-I'll-do-better-next-time type of lecture. You cannot go in front of the camera and "wing it."

Prior to 1995 it was always a struggle to get materials back and forth to the remote sites in a timely fashion. It would still be a problem were it not for the web and easily transmittable documents. Distributing materials via .pdf files is now extremely easy. And likewise, more and more students are submitting their assignments via electronic documents as attachments to emails. This is one aspect of the distance model that now works very well. I put up my first web page in 1995 and used it that fall semester to distribute information such as the syllabus, lecture materials, notes, homework assignments, etc. If it were not for the advent of the web, I think that this model of distance education would still be a difficult and cumbersome approach. In my opinion, however, this model together with the web access to materials and communication, have moved distance learning from a so-so proposition to something

that has a great deal of potential, if properly managed. I feel that we as educators (not just in the discipline of statistics, but all of academe) must take a closer look at this model and work to make it reach its fullest potential. It is here whether we like it or not. We can ignore it and get left behind. Or we can work to bring our input into the development of the content and execution of this type of teaching.

This newsletter is dedicated to all those who make CGEP a success. Obviously, without the students and professors, there would be no need for a program. But, we don't want to forget all those who work as support personnel. Whether you serve as a director, an administrator, or a technician, set up a classroom, provide computer support, handle applications, enter registrations, make copies, send faxes, mail homework, recruit students, advise or assist students, record tapes, develop web sites, serve as a TA, answer phone calls, or in any other way contribute to the program, you're a very important part of CGEP. Thank you!

This newsletter was developed and organized by Rita F. Kostoff, CGEP Administrator at the University of Virginia (for 13 years). Thanks to everyone who contributed articles, photos, or otherwise assisted in the publication of this newsletter. Your comments may be sent to rjk2u@virginia.edu

(Facts presented are to the best of my knowledge. I apologize for any errors or omissions.)

CGEP Web Site:
<http://cgep.schev.edu/>